Trend Study 24-1-03

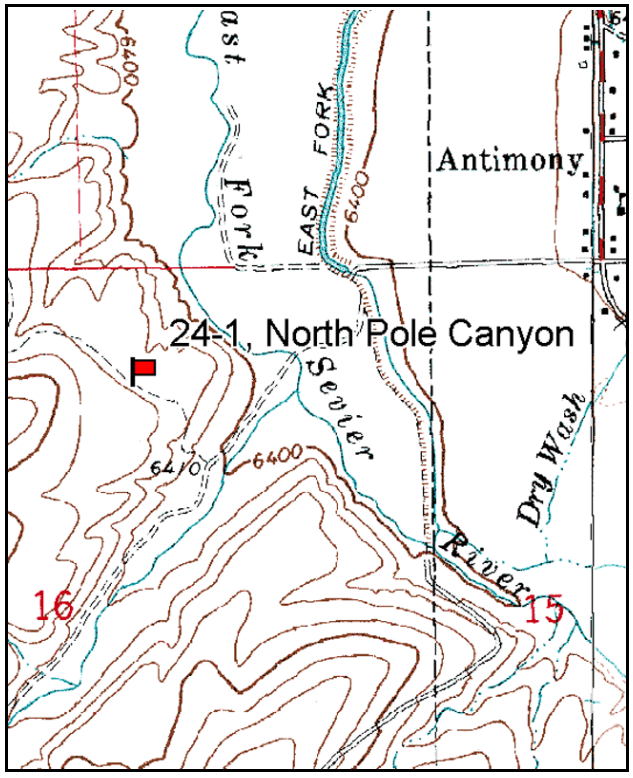
Study site name: N. Pole Canyon . Vegetation type: Wyoming Big Sagebrush .

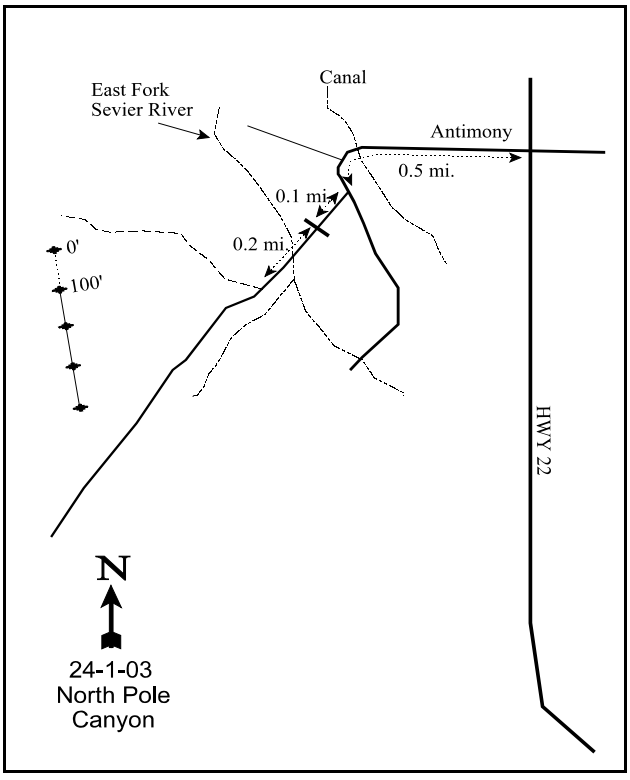
Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft.), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 2 on 3ft.

LOCATION DESCRIPTION

From the town of Antimony, drive west on the Mt. Dutton road for approximately 0.5 mile to a canal and bridge. Just past the canal bridge, turn right, go through a gate and bear left down towards the Sevier River. Go 0.1 mile to another gate. Go through the gate and continue 0.2 miles across a field to the river. The old road is washed out, so cross the river on foot and hike up the hill to the southwest along an old jeep trail. The transect is on top of the hill and starts 20 feet south of the old road. The study is marked by short, green fence posts. There is a browse tag on the 0' stake.





Map Name: Deep Creek

Diagrammatic Sketch

Township 31S , Range 2W , Section 16

GPS: NAD 27, UTM 12S 4218738 N,411278 E

DISCUSSION

North Pole Canyon - Trend Study 24-1

The North Pole Canyon study is located on a bench above the East Fork of the Sevier River and about one-half mile from the town of Antimony. The site is at an elevation of about 6,520 feet with a gentle 4% slope and a slight northeast aspect. It is a key area for wintering mule deer. Deer concentrate on the bench and utilize forage from adjacent agricultural lands in the valley during the spring and fall. Cattle use this area in the spring, and it appears as though the area has been overstocked in the past. This site does not receive much pressure from people since the jeep trail across the East Fork of the Sevier River has been washed out. The only activities on this bench are those associated with livestock grazing. Pellet group data from 2003 estimated 42 deer and 20 cow days use/acre (104 ddu/ha and 48 cdu/ha). Deer pellet groups appeared to be from winter use while cattle pats were from the previous year (2002).

Soil on the site is relatively shallow with an effective rooting depth estimated at 12 inches. The soil profile is very rocky with considerable amounts of rock and pavement on the surface. Soil temperature was relatively high averaging 67°F at an average depth of 15 inches in 2003. Soil texture is a sandy clay loam which is neutral in reaction (pH 6.8). Organic matter is limited at 1.3%, the lowest level of all the sites on the unit. The soil is vulnerable to erosion with an average of about 33% bare soil since 1987. Pedestalling around plants, especially the older sagebrush, is evident and small active gullies are found on the site. Litter is limited averaging 38% in 1991, but declining to only 16% in 1997. It is restricted mainly to the area directly beneath the sagebrush canopy.

The key species is Wyoming big sagebrush, which accounts for virtually 100% of the shrub cover. The stand was fairly dense in 1987 with an estimated 5,998 plants/acre. Many of the interspaces were occupied by seedlings (3,433/acre) in 1987. Young plants were also common at that time accounting for 48% of the population. However, sagebrush density dropped by 27% by 1991 to 4,399 plants/acre and the number of decadent plants increased from 9% to 51%. In addition, 72% of the decadent plants were classified as dying (>50% crown death). During the 1997 reading, the population remained relatively stable at 4,420 plants/acre. Percent decadence declined to 12% and recruitment was good with 39% of the population consisting of young plants. Vigor was normal on most plants. Drought conditions in 2003 contributed to a 32% decline in population density to 3,020 plants/acre. Vigor was considered poor on nearly half of the plants sampled (45%) and 80% of the population was classified as decadent. In addition, 54% of the decadent plants sampled were rated as dying. No seedlings were encountered and young plants accounted for only 8% of the population. The stand received considerable use in 1987 when 84% of the shrubs were moderate or heavily hedged. Since then, use has been classified as mostly light to moderate with a few plants exhibiting heavy hedging.

Herbaceous species are lacking in the area. Blue grama is the only abundant grass. It is a warm season species which provides limited forage due to its low growth form. Perennial forbs are nearly absent but weedy annual forbs consisting of goosefoot, nodding eriogonum, and stickseed were abundant in 1997.

1991 TREND ASSESSMENT

Soil trend appears to be stable, but in very poor condition. Recent gullies formed by flash floods are evident and there is potential for gullies to enlarge with the lack of cover in the interspaces. The dominant overstory is Wyoming big sagebrush. Although heavy hedging has decreased by nearly 30%, the sagebrush population went from 9% decadent to 51% decadent, showing a downward trend. The increase in weedy annual forbs and no desirable species is a cause for concern. Grasses have also decreased slightly on the site.

TREND ASSESSMENT
soil - stable, but in poor condition (3)
browse - down (1)
herbaceous understory - down slightly (2)

1997 TREND ASSESSMENT

Trend for soil is stable, but still in poor condition. Percent bare ground has declined slightly since 1991 with litter cover also decreasing. Trend for Wyoming big sagebrush is up slightly. Density has remained relatively similar to 1991 estimates. However, utilization is lighter, vigor improved, and percent decadence has declined from 51% to 12%. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses has remained similar to 1991 estimates with the frequency of forbs increasing. However, five of the six forbs encountered in 1997 are weedy annuals consisting of goosefoot, nodding eriogonum, and stickseed. These weedy species accounted for more than 99% of the forb cover. The only perennial forb encountered on the site was Utah milkvetch which occurred in only 2 of the 100 quadrats.

TREND ASSESSMENT
soil - stable, but in poor condition (3)
browse - up slightly (4)
herbaceous understory - stable, but poor (3)

2003 TREND ASSESSMENT

Trend for soil remains stable but poor. Percent cover of bare ground remains high at 31% while litter and vegetation cover increased slightly. The gentle terrain limits severe erosion and cover of blue grama more than doubled since 1997. Trend for Wyoming big sagebrush is down. Density declined 32% from 4,420 to 3,020 plants/acre. Nearly half (45%) of the sagebrush sampled displayed poor vigor and 80% of the population was classified as decadent. In addition, 54% of the decadent plants sampled were rated as dying (>50% crown death). No seedlings were encountered and young plants accounted for only 8% of the population. Utilization was mostly light to moderate. These trends appear to be caused primarily by drought conditions which have effected this area for the past few years. Spring precipitation (April - June) has been extremely low between 2000 and 2003, averaging only 46% of normal at the Angle, Utah weather station (Utah climate summaries 2004). This lack of spring precipitation with more normal summer rainfall has caused an increase in the warm season perennial grass, blue grama. It increased significantly in nested frequency and more than doubled in average cover from 7% in 1997 to 18% in 2003. Other grasses are rare in their occurrence and forbs remain rare as well. Trend for the herbaceous understory is considered up slightly.

TREND ASSESSMENT
soil - stable, but in poor condition (3)
browse - down (1)
herbaceous understory - up slightly but poor (4)

HERBACEOUS TRENDS --
Management unit 24 , Study no: 1

Type	Species	Nested Frequency				Average Cover %	
		'87	'91	'97	'03	'97	'03
G	Bouteloua gracilis	$_{ab}$240	$_{ab}$210	$_{a}$203	$_{b}$244	7.00	18.33
G	Bromus tectorum (a)	1	-	-	-	-	-
G	Oryzopsis hymenoides	3	1	-	-	.00	-
G	Sitanion hystrix	2	-	-	-	-	-
G	Sporobolus cryptandrus	$_{b}$15	$_{ab}$9	$_{a}$1	$_{ab}$12	.01	.38
G	Stipa comata	4	-	1	-	.00	-
Total for Annual Grasses		1	0	0	0	0	0
Total for Perennial Grasses		264	220	205	256	7.02	18.71
Total for Grasses		265	220	205	256	7.02	18.71
F	Astragalus utahensis	-	-	2	-	.01	-
F	Chenopodium fremontii (a)	$_{b}$10	$_{c}$75	$_{d}$194	$_{a}$-	6.01	-
F	Chenopodium leptophyllum(a)	-	-	$_{b}$108	$_{a}$1	1.19	.03
F	Eriogonum cernuum (a)	-	$_{a}$3	$_{b}$83	$_{a}$2	1.09	.03
F	Lappula occidentalis (a)	-	-	24	10	.05	.04
F	Salsola iberica (a)	3	-	-	-	-	-
F	Sphaeralcea grossulariaefolia	-	-	-	2	-	.03
Total for Annual Forbs		13	78	409	13	8.35	0.11
Total for Perennial Forbs		0	0	2	2	0.01	0.03
Total for Forbs		13	78	411	15	8.36	0.14

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 24 , Study no: 1

Type	Species	Strip Frequency		Average Cover %	
		'97	'03	'97	'03
B	Artemisia tridentata wyomingensis	75	74	6.47	6.05
B	Ceratoides lanata	0	2	-	-
B	Chrysothamnus nauseosus	1	0	-	-
B	Chrysothamnus viscidiflorus	0	1	-	.03
B	Sclerocactus	2	0	-	-
Total for Browse		78	77	6.47	6.08

CANOPY COVER, LINE INTERCEPT --
Management unit 24 , Study no: 1

Species	Percent Cover '03
Artemisia tridentata wyomingensis	3.73
Chrysothamnus depressus	1.28

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 24 , Study no: 1

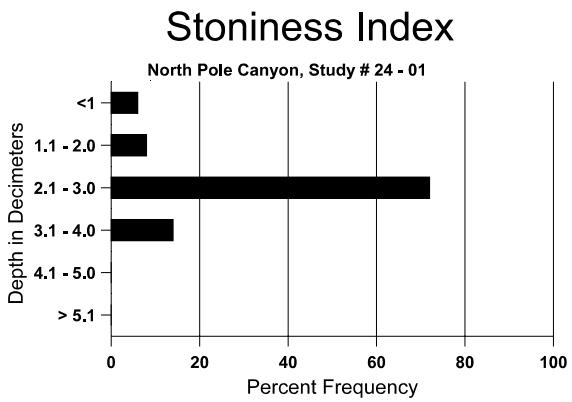
Species	Average leader growth (in) '03
Artemisia tridentata wyomingensis	2.2

BASIC COVER --
Management unit 24 , Study no: 1

Cover Type	Average Cover %			
	'87	'91	'97	'03
Vegetation	14.50	6.75	21.54	25.59
Rock	6.75	4.75	7.22	9.19
Pavement	15.00	16.25	20.33	21.87
Litter	29.00	38.00	16.26	17.27
Cryptogams	0	0	.18	.22
Bare Ground	34.75	34.25	29.45	31.46

SOIL ANALYSIS DATA --
Management unit 24, Study no: 1, Study Name: North Pole Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
12.1	67.0 (15.0)	6.8	52.7	22.7	24.6	1.3	12.3	188.8	1.2



PELLET GROUP DATA --
Management unit 24 , Study no: 1

Type	Quadrat Frequency '97	Quadrat Frequency '03	Days use per acre (ha) '03
Rabbit	7	19	-
Elk	1	-	-
Deer	20	15	42 (104)
Cattle	5	5	20 (48)

BROWSE CHARACTERISTICS --
Management unit 24 , Study no: 1

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis											
87	**5998**	3433	2866	2566	566	-	41	43	9	11	13/18
91	**4399**	133	1000	1166	2233	-	17	14	51	37	12/19
97	**4420**	360	1720	2180	520	840	8	.45	12	8	18/26
03	**3020**	-	240	360	2420	1320	28	5	80	45	15/20
Ceratoides lanata											
87	**133**	33	33	100	-	-	50	25	0	0	12/2
91	**133**	-	-	133	-	-	0	50	0	0	7/7
97	**0**	-	-	-	-	-	0	0	0	0	-/-
03	**40**	-	-	20	20	-	0	100	50	0	12/10
Chrysothamnus nauseosus											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
97	**80**	-	-	80	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Chrysothamnus viscidiflorus											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
97	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**20**	-	-	20	-	-	0	0	-	0	6/4
Sclerocactus											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
97	**60**	-	40	20	-	-	0	0	-	0	11/11
03	**0**	-	-	-	-	-	0	0	-	0	1/2